ABSTRACT

A process for the preparation of a polymer composite loaded with functioning matter wherein the process comprises contacting a polymer substrate and functioning matter with a plasticising fluid or mixture of plasticising fluids under plasticising conditions to plasticise and/or swell the polymer and incorporate the functioning matter, and releasing the plasticising fluid to obtain the polymer composite, wherein contacting is at a pressure in the range 1 to 1000 bar and a temperature in the range –200 to +500C, selected in manner that at least a proportion of functioning matter does not freeze or refreeze during processing, or if at a temperature at which freezing or refreezing may occur, that either matter is desiccated or a pressure constraint is applied whereby pressure is in a range having a maximum pressure less than 1000 bar throughout contact of functioning matter and plasticising fluid, whereby at least a proportion of functioning matter retains its function in the polymer composite; A polymer composite obtained with the process; A scaffold comprising a polymer composite loaded with functioning matter, optionally additionally comprising biofunctional materials; An apparatus for use in the preparation of the polymer composite or with use of the process; and use of the composite as a support or scaffold for drug delivery, for use in bioremediation, as a biocatalyst or biobarrier for human or animal or plant matter, for use as a structural component, for example comprising the polymer and optional additional synthetic or natural metal, plastic, carbon or glass fibre mesh, scrim, rod or like reinforcing for medical or surgical insertion, for insertion as a solid monolith into bone or tissue, as fillers or cements for wet insertion into bone or teeth or as solid aggregates or monoliths for orthopaedic implants such as pins, or dental implants such as crowns etc.